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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,372	12/10/2001	Tomio Sugiyama	P 283339 U3-9818-TS-A	1390
909	7590	11/10/2003	EXAMINER	
PILLSBURY WINTHROP, LLP			OLSEN, KAJ K	
P.O. BOX 10500			ART UNIT	
MCLEAN, VA 22102			PAPER NUMBER	

1753

DATE MAILED: 11/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/006,372	SUGIYAMA ET AL.	
	Examiner	Art Unit	
	Kaj Olsen	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 14-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All   b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/100,230.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                      | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) ____.   |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                             | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>12/10</u> . | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 15 appears to be specifying that second electrodes of both the oxygen sensor cell and the NOx sensor cell are the same common electrode. However, the claim is worded such that it seems like the applicant is defining an additional electrode over the already set forth electrodes. Applicant should reword the claim such that it instead specifies that the second electrodes of the oxygen sensor cell and NOx sensor cell are a common reference electrode.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

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the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 0 678 740 A1 (hereafter "EP '740") in view of either Oshima et al (USP 6,071,393) or WO 95/30146 (hereafter "WO '146").

7. EP '740 sets forth a gas sensor comprising a reference gas chamber 10 and a sample gas chamber 8 defined by at least one solid electrolytic substrate; a sample gas introducing passage (12, 50, or 52) for introducing a sample gas into said sample gas chamber (col. 12, lines 1-17). EP '740 further discloses a first solid electrolytic substrate 4a having an inside surface defining a wall of said sample gas chamber and an outside surface to be exposed to said sample gas before said sample gas is introduced into said sample gas chamber (fig. 17 and col. 11, lines 27-38). EP '740 further discloses a pump cell including first and second pumping electrodes (16, 18) provided on said first solid electrolytic substrate, said first pumping electrode being arranged so as to be exposed to said sample gas before said sample gas is introduced into said sample gas chamber, and said second pumping electrode being arranged so as to be exposed to the sample gas introduced into said sample gas chamber via said sample gas introducing passage, so that oxygen gas residing in said sample gas chamber is discharged from said sample gas chamber by predetermined amount via said sample gas introducing passage when a voltage of a power source is applied between said first and second pumping electrodes (col. 14, lines 9-16). EP '740 further discloses a second solid electrolytic substrate 4c having a surface defining a wall of said sample gas chamber and another surface defining a wall of said reference gas chamber; an

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oxygen sensor cell having first and second oxygen sensing electrodes (22, 24) provided on said second solid electrolytic substrate to measure all oxygen concentration of said sample gas residing in said sample gas chamber, said first oxygen sensing electrode being arranged so as to be exposed to the sample gas stored in said sample gas chamber and said second oxygen sensing electrode being arranged so as to be exposed to a reference gas stored in said reference gas chamber (fig. 17 and 18). EP '740 further discloses a NOx sensor cell having first and second NOx sensing electrodes (28, 24) provided on said second solid electrolytic substrate, said first NOx sensing electrode 28 being arranged so as to be exposed to the sample gas stored in said sample gas chamber and said second NOx sensing electrode 24 being arranged so as to be exposed to the reference gas stored in said reference gas chamber, to measure a NOx concentration of the sample gas residing in said sample gas chamber after the discharging of oxygen gas by said pump cell is performed in response to a voltage of a power source applied between said first and second NOx electrodes (col. 15, lines 15-47). EP '740 further discloses a heater member 36 provided for heating said first and second solid electrolytic substrates, said heater member being located far from said first solid electrolytic substrate and close to said second solid electrolytic substrate via said reference gas chamber (fig. 17, 18, and paragraph bridging col. 17 and 18). EP '740 further discloses an ammeter 32 serially connected between said power source and said first NOx sensing electrode of said NOx sensor cell to detect a limit current value representing the NOx concentration of the sample gas residing in said sample gas chamber (fig. 13, lines 31-40).

8. EP '740 does not explicitly disclose the presence of a second ammeter serially connected between said power source and said first pumping electrode of said pump cell. Oshima discloses

in an alternate NO<sub>x</sub> sensor that a second ammeter 16 connected to the pump cell 6 can be utilized for the determination of the oxygen content of the exhaust gas (fig. 10; col. 3, lines 2-13; and col. 17, lines 58-66). WO '146 also teaches in an alternate NO<sub>x</sub> sensor that an ammeter 8 on the pump cell of sensor can be utilized for the measure of oxygen (main paragraph of page 4). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teachings of either Oshima or WO '146 for the sensor of EP '740 in order to provide a simultaneous measure of oxygen (i.e. air/fuel ratio) thereby further increasing the utility of the sensor.

9. With respect to claim 15, see the oxygen sensor cell and NO<sub>x</sub> sensor cell share common reference electrode 24.

10. With respect to claim 16, see fig. 2 of EP '740.

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP '740 and either Oshima or WO '146 as applied to claim 14 above, and further in evidence or in view of Joshi (USP 4,879,016).

12. The references set forth all the limitations of the claim and EP '740 further discloses the use of porous layers for the gas introduction passage (fig. 18). The references did not explicitly set forth the use porous solid electrolyte layers. However, Joshi evidences that sintered zirconia electrolytes typically have a theoretical density of 95% (i.e. they are inherently 5% porous) (col. 7, lines 20-26). Hence Joshi evidences that even when high-density electrolytes are desired, there is still some residual porosity owing to the sintering process of the electrolyte and the electrolytes of EP '740, Oshima, and WO '146 are inherently porous. Alternatively, Joshi teaches that a small amount of porosity in the various components of the sensor device provides

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enhanced oxygen diffusion (col. 7, lines 20-22). Hence, it would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Joshi for the sensor of EP '740 and Oshima or WO '146 in order to enhance oxygen diffusion which would reduce internal resistances.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (703) 305-0506. The examiner can normally be reached on Monday through Thursday from 7:00 AM-4:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Mr. Nam Nguyen, can be reached at (703) 308-3322.

When filing a fax in Group 1700, please indicate in the header "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communications with the PTO that are not for entry into the file of this application. This will expedite processing of your papers. The fax number for regular communications is (703) 305-3599 and the fax number form after-final communications is (703) 305-5408.

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Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0661.

A handwritten signature in black ink, appearing to read 'Kaj K. Olsen', with a stylized, flowing script.

Kaj K. Olsen  
Patent Examiner  
AU 1753  
November 3, 2003